CITY OF CINCINNATI
DEPARTMENT OF BUILDINGS AND INSPECTIONS
3300 Central Parkway
Cincinnati, Ohio 45225

(513) 352-3271

E

ENERGY CODE COMPLIANCE REPORT
FOR MULTIPLE FAMILY GREATER THAN THREE STORIES
AND ALL NONRESIDENTIAL BUILDINGS

Project Address:_____

Indicate the method of showing compliance

Exceptions to Energy Code Submittals:

- ❑ Building Not Heated or Cooled
- ❑ Design Peak Energy Use less than 1 Watt/sq.ft

- ❑ Completion of Parts I through III of this form.
- ❑ Submittal of COMcheck-EZ 2.2 or later version software generated envelope summary and lighting and mechanical compliance statements. (Software available at www.energycodes.gov)
- ❑ Submittal of COMcheck-Plus 1.1 software generated envelope summary and envelope, lighting and mechanical compliance statements.
- ❑ Submittal of ASHRAE 90.1 Envelope (ENVSTD 4.0) computer generated report with envelope, mechanical and electrical compliance statements.
- ❑ Submittal of ASHRAE 90.1 manually generated summary forms. See ASHRAE's 90.1 User's Manual.
- ❑ ASHRAE 90.1 Cost Budget Method - Computer Analysis attached.

PART ONE

ENVELOPE SUMMARY: ATTACH COMPLETED IECC ACCEPTABLE PRACTICE WORKSHEET OR ASHRAE TABLE 5.3 USING VALUES IN TABLE B-13.

PART TWO

ELECTRICAL DISTRIBUTION SYSTEMS:

A. Meeting controls, switching and wiring complies with Section 805.2 IECC.

B. Interior lighting budget complies with Section 805.4 IECC.

C. Exterior lighting complies with Section 805.5 IECC

PART THREE

MECHANICAL SYSTEMS:

A. Mechanical equipment efficiencies comply with Section 803.2 IECC.

B. Temperature and Humidity controls comply with Section 803.3.3 through 803.3.4 IECC.

C. Economizer is provided per Section 803.3.3.5 IECC or is exempt.

D. Duct and pipe insulation comply with Section 803.3.6 IEEC.

E. Building service water heating insulation and controls comply with Section 804 IECC.

This project has been designed to comply with the above energy code requirements.

The design professional of record for this building hereby certifies that the information and statements given on this application, drawings, and specifications are, to the best of their knowledge, true and correct.

SIGNATURE OF DESIGN PROFESSIONAL _____

FIRM NAME _____

ADDRESS _____

BEB

IECC Acceptable Practice Worksheet

for Commercial Buildings (a)

BUILDING ENVELOPE REQUIREMENTS

_____% WINDOW AND GLAZED DOOR AREA OF THE ABOVE-GRADE WALL AREA (b) (c) (d)

ELEMENT (e)	CONDITION/VALUE (f)		
Skylights (*U*-factor) (l)			
Slab or below-grade wall (*R*-value) (g) (h) (i)			
Windows and glass doors	SHGC	*U*-factor	
PF< 0.25			
0.25 ≤ PF < 0.50			
PF ≥ 0.50			
Roof assemblies (R-value) (f)	Insulation between framing	Continuous insulation	
All-wood joist/truss			
Metal joist/truss			
Concrete slab or deck			
Metal purlin with thermal block			
Metal purlin without thermal block			
Floors over outdoor air or unconditioned space (R-value) (f)	Insulation between framing	Continuous insulation	
All-wood joist/truss			
Metal joist/truss			
Concrete slab or deck			
Above-grade walls (*R*-value) (j) (f) (k)	No framing	Metal framing	Wood framing
Framed *R*-value cavity	NA		
R-value continuous	NA		
CMU, > 8 in, with integral insulation *R*-value cavity	NA		
R-value continuous			
Other masonry walls *R*-value cavity	NA		
R-value continuous			

(a) Commercial building. All buildings over three stories in height above grade or buildings, other than residential buildings, that are three stores or less in height above grade.

(b) The percentage of wall that is glazed shall be determined by dividing the aggregate area of rough openings for glazing (windows and glazed doors) in all the above-grade walls associated with the building envelope by the total gross area of all above-grade exterior walls that are a part of the building envelope.

(c) Nonglazed doors shall meet the applicable requirements for windows and glazed doors and be considered as part of the gross area of above-grade walls that are part of the building envelope.

(d) Window, sliding or swinging doors and curtain wall assemblies that are part of the building envelope shall be tested and listed as meeting AAMA/WDMA 101/I.S.2.

Exception: Site-constructed windows and doors that are weatherstripped or sealed in accordance with Section 802.3.2

Commercial entrance doors shall have a maximum air infiltration rate of 1.75 cubic feet per minute (cfm)/ft^2 (32.0 $m^3/h \cdot m^2$) of the door area when tested in accordance with ASTM E 283.

(e) Moisture control. All framed walls, floors, and ceilings not ventilated to allow moisture to escape shall be provided with an approved vapor retarder having a maximum permeance rating of 1.0 perm (5.72×10^{-8} $g/Pa \cdot s \cdot m^2$), when tested in accordance with Procedure A of ASTM E 96, on the warm-in-winter side of the insulation.

(f) The minimum thermal resistance (R-value) of the insulating material(s) installed in the wall cavity between the framing members and continuously on the walls shall be based on framing type and construction materials used in the wall assembly. Where both cavity and continuous insulation values are provided both requirements shall be met.

(g) Below-grade walls covered are basement or first-story walls associated with the exterior of the building that are at least 85 percent below grade.

(h) Slabs on grade. The insulation shall be placed on the out side of the foundation or on the inside of a foundation wall. The insulation shall extend downward from the top of the slab for a minimum of 48 inches (1219 mm) or downward to at least the bottom of the slab and then horizontally to the interior or exterior for a minimum total distance of 48 inches (1219 mm).

(i) Below-grade walls. The minimum thermal resistance (*R*-value) of the insulating material installed in, or continuously on, the below-grade walls shall extend to a depth of 10 feet (3048 mm) below the outside finish ground level, or to the level of the floor, whichever is less.

(g) Below-grade walls covered are basement or first-story walls associated with the exterior of the building that are at least 85 percent below grade.

(k) Interior walls. The minimum thermal resistance (R-value) of the insulating material installed in the wall cavity or continuously on the interior walls shall be as specified for above-grade walls, regardless of glazing area, based on framing type and construction materials used in the wall assembly.

(l) Skylights located in the building envelope shall be limited to 3 percent of the gross roof assembly area.

TABLE 802.2(26)
BUILDING ENVELOPE REQUIREMENTS[a through e] - CLIMATE ZONE 11b

WINDOW AND GLAZED DOOR AREA 10 PERCENT OR LESS OF ABOVE-GRADE WALL AREA			
ELEMENT	**CONDITION/VALUE**		
Skylights (*U*-factor)	0.8		
Slab or below-grade wall (*R*-value)	R-0		
Windows and glass doors	**SHGC**	***U*-factor**	
PF < 0.25	Any	Any	
0.25 ≤ PF < 0.50	Any	Any	
PF ≥ 0.50	Any	Any	
Roof assemblies (*R*-value)	**Insulation between framing**	**Continuous insulation**	
All-wood joist/truss	R-25	R-18	
Metal joist/truss	R-25	R-19	
Concrete slab or deck	NA	R-18	
Metal purlin with thermal block	R-30	R-19	
Metal purlin without thermal block	X	R-19	
Floors over outdoor air or unconditioned space (*R*-value)	**Insulation between framing**	**Continuous insulation**	
All-wood joist/truss	R-19	R-14	
Metal joist/truss	R-19	R-15	
Concrete slab or deck	NA	R-15	
Above-grade walls (*R*-value)	**No framing**	**Metal framing**	**Wood framing**
Framed			
R-value cavity	NA	R-11	R-11
R-value continuous	NA	R-0	R-0
CMU, ≥ 8 in, with integral insulation			
R-value cavity	NA	R-11	R-11
R-value continuous	R-5	R-0	R-0
Other masonry walls			
R-value cavity	NA	R-11	R-11
R-value continuous	R-5	R-0	R-0

WINDOW AND GLAZED DOOR AREA OVER 10 PERCENT BUT NOT GREATER THAN 25 PERCENT OF ABOVE-GRADE WALL AREA			
ELEMENT	**CONDITION/VALUE**		
Skylights (*U*-factor)	0.8		
Slab or below-grade wall (*R*-value)	R-0		
Windows and glass doors	**SHGC**	***U*-factor**	
PF < 0.25	0.5	0.6	
0.25 ≤ PF < 0.50	0.6	0.6	
PF ≥ 0.50	0.7	0.6	
Roof assemblies (*R*-value)	**Insulation between framing**	**Continuous insulation**	
All-wood joist/truss	R-25	R-19	
Metal joist/truss	R-25	R-20	
Concrete slab or deck	NA	R-19	
Metal purlin with thermal block	R-30	R-20	
Metal purlin without thermal block	X	R-20	
Floors over outdoor air or unconditioned space (*R*-value)	**Insulation between framing**	**Continuous insulation**	
All-wood joist/truss	R-19	R-14	
Metal joist/truss	R-19	R-15	
Concrete slab or deck	NA	R-15	
Above-grade walls (*R*-value)	**No framing**	**Metal framing**	**Wood framing**
Framed			
R-value cavity	NA	R-11	R-11
R-value continuous	NA	R-0	R-0
CMU, ≥ 8 in, with integral insulation			
R-value cavity	NA	R-11	R-11
R-value continuous	R-5	R-0	R-0
Other masonry walls			
R-value cavity	NA	R-11	R-11
R-value continuous	R-5	R-0	R-0

(continued)

TABLE 802.2(26)—continued
BUILDING ENVELOPE REQUIREMENTS[a through e] - CLIMATE ZONE 11b

WINDOW AND GLAZED DOOR AREA OVER 25 PERCENT BUT NOT GREATER THAN 40 PERCENT OF ABOVE-GRADE WALL AREA			
ELEMENT	CONDITION/VALUE		
Skylights (*U*-factor)	0.8		
Slab or below-grade wall (*R*-value)	R-8		
Windows and glass doors	SHGC	*U*-factor	
PF < 0.25	0.4	0.5	
0.25 ≤ PF < 0.50	0.5	0.5	
PF ≥ 0.50	0.6	0.5	
Roof assemblies (*R*-value)	Insulation between framing	Continuous insulation	
All-wood joist/truss	R-30	R-23	
Metal joist/truss	R-30	R-24	
Concrete slab or deck	NA	R-23	
Metal purlin with thermal block	X	R-24	
Metal purlin without thermal block	X	R-24	
Floors over outdoor air or unconditioned space (*R*-value)	Insulation between framing	Continuous insulation	
All-wood joist/truss	R-19	R-14	
Metal joist/truss	R-19	R-15	
Concrete slab or deck	NA	R-15	
Above-grade walls (*R*-value)	No framing	Metal framing	Wood framing
Framed			
R-value cavity	NA	R-11	R-11
R-value continuous	NA	R-0	R-0
CMU, ≥ 8 in. with integral insulation			
R-value cavity	NA	R-11	R-11
R-value continuous	R-5	R-0	R-0
Other masonry walls			
R-value cavity	NA	R-11	R-11
R-value continuous	R-5	R-0	R-0

WINDOW AND GLAZED DOOR AREA OVER 40 PERCENT BUT NOT GREATER THAN 50 PERCENT OF ABOVE-GRADE WALL AREA			
ELEMENT	CONDITION/VALUE		
Skylights (*U*-factor)	0.8		
Slab or below-grade wall (*R*-value)	R-8		
Windows and glass doors	SHGC	*U*-factor	
PF < 0.25	0.3	0.5	
0.25 ≤ PF < 0.50	0.4	0.5	
PF ≥ 0.50	0.5	0.5	
Roof assemblies (*R*-value)	Insulation between framing	Continuous insulation	
All-wood joist/truss	R-30	R-23	
Metal joist/truss	R-30	R-24	
Concrete slab or deck	NA	R-23	
Metal purlin with thermal block	R-30	R-24	
Metal purlin without thermal block	R-38	R-24	
Floors over outdoor air or unconditioned space (*R*-value)	Insulation between framing	Continuous insulation	
All-wood joist/truss	R-19	R-14	
Metal joist/truss	R-19	R-15	
Concrete slab or deck	NA	R-15	
Above-grade walls (*R*-value)	No framing	Metal framing	Wood framing
Framed			
R-value cavity	NA	R-13	R-11
R-value continuous	NA	R-3	R-0
CMU, ≥ 8 in. with integral insulation			
R-value cavity	NA	R-11	R-11
R-value continuous	R-5	R-0	R-0
Other masonry walls			
R-value cavity	NA	R-11	R-11
R-value continuous	R-5	R-0	R-0

For SI: 1 inch = 25.4 mm.

a. Values from Tables 802.2(5) through 802.2(37) shall be used for the purpose of the completion of Tables 802.2(1) through 802.2(4), as applicable based on window and glazed door area.

b. "NA" indicates the condition is not applicable.

c. An *R*-value of zero indicates no insulation is required.

d. "Any" indicates any available product will comply.

e. "X" indicates no complying option exists for this condition.

TABLE 5.3
Example Building Envelope Requirements
(Values can be found in the appropriate tables in Normative Appendix B)

Opaque Elements	Nonresidential		Residential		Semiheated	
	Assembly Maximum	Insulation Min. R-Value	Assembly Maximum	Insulation Min. R-Value	Assembly Maximum	Insulation Min. R-Value
Roofs						
Insulation Entirely Above Deck	U-	R-	U-	R-	U-	R-
Metal Building	U-	R-	U-	R-	U-	R-
Attic and Other	U-	R-	U-	R-	U-	R-
Walls, Above Grade						
Mass	U-	R-	U-	R-	U-	R-
Metal Building	U-	R-	U-	R-	U-	R-
Steel Framed	U-	R-	U-	R-	U-	R-
Wood Framed and Other	U-	R-	U-	R-	U-	R-
Walls, Below Grade						
Below-Grade Wall	C-	R-	C-	R-	C-	R-
Floors						
Mass	U-	R-	U-	R-	U-	R-
Steel Joist	U-	R-	U-	R-	U-	R-
Wood Framed and Other	U-	R-	U-	R-	U-	R-
Slab-On-Grade Floors						
Unheated	F-	R-	F-	R-	F-	R-
Heated	F-	R-	F-	R-	F-	R-
Opaque Doors						
Swinging	U-		U-		U-	
Non-Swinging	U-		U-		U-	
Fenestration	Assembly Max. U (Fixed/ Operable)	Assembly Max. SHGC (All Orientations/ North-Oriented)	Assembly Max. U (Fixed/ Operable)	Assembly Max. SHGC (All Orientations/ North-Oriented)	Assembly Max. U (Fixed/ Operable)	Assembly Max. SHGC (All Orientations/ North-Oriented)
Vertical Glazing, % of Wall						
0-10.0%	U_{fixed}-	$SHGC_{all}$-	U_{fixed}-	$SHGC_{all}$-	U_{fixed}-	$SHGC_{all}$-
	U_{oper}-	$SHGC_{north}$-	U_{oper}-	$SHGC_{north}$-	U_{oper}-	$SHGC_{north}$-
10.1-20.0%	U_{fixed}-	$SHGC_{all}$-	U_{fixed}-	$SHGC_{all}$-	U_{fixed}-	$SHGC_{all}$-
	U_{oper}-	$SHGC_{north}$-	U_{oper}-	$SHGC_{north}$-	U_{oper}-	$SHGC_{north}$-
20.1-30.0%	U_{fixed}-	$SHGC_{all}$-	U_{fixed}-	$SHGC_{all}$-	U_{fixed}-	$SHGC_{all}$-
	U_{oper}-	$SHGC_{north}$-	U_{oper}-	$SHGC_{north}$-	U_{oper}-	$SHGC_{north}$-
30.1-40.0%	U_{fixed}-	$SHGC_{all}$-	U_{fixed}-	$SHGC_{all}$-	U_{fixed}-	$SHGC_{all}$-
	U_{oper}-	$SHGC_{north}$-	U_{oper}-	$SHGC_{north}$-	U_{oper}-	$SHGC_{north}$-
40.1-50.0%	U_{fixed}-	$SHGC_{all}$-	U_{fixed}-	$SHGC_{all}$-	U_{fixed}-	$SHGC_{all}$-
	U_{oper}-	$SHGC_{north}$-	U_{oper}-	$SHGC_{north}$-	U_{oper}-	$SHGC_{north}$-
Skylight with Curb, Glass, % of Roof						
0-2.0%	U_{all}-	$SHGC_{all}$-	U_{all}-	$SHGC_{all}$-	U_{all}-	$SHGC_{all}$-
2.1-5.0%	U_{all}-	$SHGC_{all}$-	U_{all}-	$SHGC_{all}$-	U_{all}-	$SHGC_{all}$-
Skylight with Curb, Plastic, % of Roof						
0-2.0%	U_{all}-	$SHGC_{all}$-	U_{all}-	$SHGC_{all}$-	U_{all}-	$SHGC_{all}$-
2.1-5.0%	U_{all}-	$SHGC_{all}$-	U_{all}-	$SHGC_{all}$-	U_{all}-	$SHGC_{all}$-
Skylight without Curb, All, % of Roof						
0-2.0%	U_{all}-	$SHGC_{all}$-	U_{all}-	$SHGC_{all}$-	U_{all}-	$SHGC_{all}$-
2.1-5.0%	U_{all}-	$SHGC_{all}$-	U_{all}-	$SHGC_{all}$-	U_{all}-	$SHGC_{all}$-

ASHRAE 90.1-1999, Table 5.3 and Table B-13 footnotes

a) Semiheated space is heated with appliances with heating output between 3.5 and 15 BTU/h.ft^2 (See Table 3.2)

b) Glazing manufacturer's SHGC's may be reduced with permanent projections using Table 5.3.2.3

c) Storefront glazing need not meet SHGC values when: See Sections 5.3.2.2 and 5.3.2.3)

1) Located on the street side of the street-level story
2) A continuous overhang with a weighted average projection factor greater than .5 is provided.
3) Fenestration area for the street side of the street-level story is less than 75% of the gross wall area for the street side of the street-level story.
4) The U-factor is not greater than that specified for 40% of the gross wall area.

d) Loading dock weatherseals shall be provided for cargo doors and loading dock doors to restrict infiltration when vehicles are parking in the doorway in accordance with Section 5.2.3.3.

e) Primary building entrances for buildings four stories or more above grade shall be provided with vestibules in accordance with Section 5.2.3.4

f) Single rafter roofs may have reduced R-values and U-values in accordance with Table 5.3.1.1 A.

TABLE B-13
Building Envelope Requirements (HDD65: 3601-5400, CDD50: 3601+)

Opaque Elements	Nonresidential		Residential		Semiheated	
	Assembly Maximum	Insulation Min. R-Value	Assembly Maximum	Insulation Min. R-Value	Assembly Maximum	Insulation Min. R-Value
Roofs						
Insulation Entirely above Deck	U-0.063	R-15.0 ci	U-0.063	R-15.0 ci	U-0.218	R-3.8 ci
Metal Building	U-0.065	R-19.0	U-0.065	R-19.0	U-0.097	R-10.0
Attic and Other	U-0.034	R-30.0	U-0.027	R-38.0	U-0.081	R-13.0
Walls, Above Grade						
Mass	U-0.151*	R-5.7 ci*	U-0.104	R-9.5 ci	U-0.580	NR
Metal Building	U-0.113	R-13.0	U-0.113	R-13.0	U-0.134	R-10.0
Steel Framed	U-0.124	R-13.0	U-0.064	R-13.0 + R-7.5 ci	U-0.124	R-13.0
Wood Framed and Other	U-0.089	R-13.0	U-0.089	R-13.0	U-0.089	R-13.0
Wall, Below Grade						
Below Grade Wall	C-1.140	NR	C-1.140	NR	C-1.140	NR
Floors						
Mass	U-0.107	R-6.3 ci	U-0.087	R-8.3 ci	U-0.322	NR
Steel Joist	U-0.052	R-19.0	U-0.038	R-30.0	U-0.069	R-13.0
Wood Framed and Other	U-0.051	R-19.0	U-0.033	R-30.0	U-0.066	R-13.0
Slab-On-Grade Floors						
Unheated	F-0.730	NR	F-0.730	NR	F-0.730	NR
Heated	F-0.950	R-7.5 for 24 in.	F-0.840	R-10 for 36 in.	F-1.020	R-7.5 for 12 in.
Opaque Doors						
Swinging	U-0.700		U-0.700		U-0.700	
Non-Swinging	U-1.450		U-0.500		U-1.450	
Fenestration	Assembly Max. U (Fixed/ Operable)	Assembly Max. SHGC (All Orientations/ North-Oriented)	Assembly Max. U (Fixed/ Operable)	Assembly Max. SHGC (All Orientations/ North-Oriented)	Assembly Max. U (Fixed/ Operable)	Assembly Max. SHGC (All Orientations/ North-Oriented)
Vertical Glazing, % of Wall						
0-10.0%	U_{fixed}-0.57 U_{oper}-0.67	$SHGC_{all}$-0.39 $SHGC_{north}$-0.49	U_{fixed}-0.57 U_{oper}-0.67	$SHGC_{all}$-0.39 $SHGC_{north}$-0.49	U_{fixed}-1.22 U_{oper}-1.27	$SHGC_{all}$-NR $SHGC_{north}$NR
10.1-20.0%	U_{fixed}-0.57 U_{oper}-0.67	$SHGC_{all}$-0.39 $SHGC_{north}$-0.49	U_{fixed}-0.57 U_{oper}-0.67	$SHGC_{all}$-0.39 $SHGC_{north}$-0.49	U_{fixed}-1.22 U_{oper}-1.27	$SHGC_{all}$-NR $SHGC_{north}$NR
20.1-30.0%	U_{fixed}-0.57 U_{oper}-0.67	$SHGC_{all}$-0.39 $SHGC_{north}$-0.49	U_{fixed}-0.57 U_{oper}-0.67	$SHGC_{all}$-0.39 $SHGC_{north}$-0.49	U_{fixed}-1.22 U_{oper}-1.27	$SHGC_{all}$-NR $SHGC_{north}$NR
30.1-40.0%	U_{fixed}-0.57 U_{oper}-0.67	$SHGC_{all}$-0.39 $SHGC_{north}$-0.49	U_{fixed}-0.57 U_{oper}-0.67	$SHGC_{all}$-0.39 $SHGC_{north}$-0.49	U_{fixed}-1.22 U_{oper}-1.27	$SHGC_{all}$-NR $SHGC_{north}$NR
40.1-50.0%	U_{fixed}-0.46 U_{oper}-0.47	$SHGC_{all}$-0.25 $SHGC_{north}$-0.36	U_{fixed}-0.46 U_{oper}-0.47	$SHGC_{all}$-0.25 $SHGC_{north}$-0.36	U_{fixed}-0.98 U_{oper}-1.02	$SHGC_{all}$-NR $SHGC_{north}$NR
Skylight with Curb, Glass, % of Roof						
0-2.0%	U_{all}-1.17	$SHGC_{all}$-0.49	U_{all}-1.17	$SHGC_{all}$-0.36	U_{all}-1.98	$SHGC_{all}$-NR
2.1-5.0%	U_{all}-1.17	$SHGC_{all}$-0.39	U_{all}-1.17	$SHGC_{all}$-0.19	U_{all}-1.98	$SHGC_{all}$-NR
Skylight with Curb, Plastic, % of Roof						
0-2.0%	U_{all}-1.30	$SHGC_{all}$-0.65	U_{all}-1.30	$SHGC_{all}$-0.62	U_{all}-1.90	$SHGC_{all}$-NR
2.1-5.0%	U_{all}-1.30	$SHGC_{all}$-0.34	U_{all}-1.30	$SHGC_{all}$-0.27	U_{all}-1.90	$SHGC_{all}$-NR
Skylight without Curb, All, % of Roof						
0-2.0%	U_{all}-0.69	$SHGC_{all}$-0.49	U_{all}-0.69	$SHGC_{all}$-0.36	U_{all}-1.36	$SHGC_{all}$-NR
2.1-5.0%	U_{all}-0.69	$SHGC_{all}$-0.39	U_{all}-0.69	$SHGC_{all}$-0.19	U_{all}-1.36	$SHGC_{all}$-NR

* Exception to 5.3.1.2a applies.